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CERTIFICATE

This is to certify that this dissertation in **"RELAPAROTOMIES"** is a work done by **Dr.RAVIKUMAR .S,** under my guidance during the period 2004 - 2007. This has been submitted in partial fulfillment of the award of M.S. Degree in General Surgery (Branch - I) by the Tamil Nadu Dr.M.G.R. Medical University, Chennai - 600 032.

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CONTENTS

INTRODUCTION

Though surgery is done for the best of indications, performed with consummate skill and followed by effective and judicious care, problems still arise that require re-operation. All the factors of bacterial growth, healing process and individual disease variability cannot be controlled. The decision to reoperate is a difficult and critical one both for the surgeon and the patient.

Surgical activity is of two kinds - decision making and operative technique. Both are more difficult the second time around.

Compared with the first surgical event, decision making associated with reoperative surgery includes more variables, each of which makes decision making complex. The primary disease process is usually more advanced, the patients are often debilitated. Metabolic and immunologic abnormalities may be present which may alter the post-operative course.

Reoperative abdominal surgery almost always presents greater technical difficulty than the first procedure. Tissue planes are absent. Fibrous scarring and numerous adhesions are present. It is no place for an impatient surgeon nor for one with little experience.

AIM OF THE STUDY

Emergency abdominal surgical procedures are often performed with a view of saving the life of an individual or preventing a serious complication. The attending surgeon has very little at his disposal for detailed investigations or consultation with his colleagues and superiors. The patient and his relatives also have limited options.

The environment in elective surgery is more serene giving more time for investigation and discussion, planning and decision making. The cure assured is expected to be more certain and naturally the patient expects a perfect result.

Unfortunately and unexpectedly complications do develop in both elective and emergency procedures which necessitate re-operations. Such situations put the surgeon in severe stress and deep introspection of the surgery performed, alternative he could have taken and precautions he could have followed. In the same way, re-operation places the patient also in fear and uncertainty of outcome.

Knowledge of such unwelcome situation will always be of help to a practicing surgeon to avoid possible mishaps and to be prepared to meet them presented.

With this aim in mind, the cases that required re-operation in the general surgery department during the period of June 2004 to June 2006 have been

analysed in the following pages with detailed discussion on the anatomy of abdominal wall, pathophysiology and decision making. The following were the primary aims of this study.

1. Indication for the first and second surgery.

2. Whether re-operation was due to any error in diagnosis of management in the first surgery.

3. Peroperative problems during second surgery.

4. Postoperative problems and their management.

5. Mortality and the cause.

6. Any possible precautions which could have been taken.

MATERIALS AND METHODS

Reoperative surgery is a confounding problem for both the surgeon and the patient. As a surgeon is training, the analysis of reoperative surgery has been done with a view that it will throw some light as to their causes, possible ways of prevention, available methods of management and the final outcome.

In this study, the following cases of reoperative surgery were taken for analysis.

1. All emergency re-operations

2. Elective re-operations in which the underlying pathology is related to previous diagnosis and (or) surgery.

Incision hernias and re-operations for an indication different from that of the previous surgery were excluded.

All cases operated in the general surgical units over a period of two years (from June 2004 to June 2006) were taken for analysis.

The following criteria were taken for study and were analysed in detail.

* Indication for first laparotomy

* Any peroperative or postoperative complications

* Indications for the re-operation

* Patient's condition on presentation
* Emergency or elective procedure
* Time interval between the two procedures
* Incision used and per-operative problems encountered
* Final outcome.

The indications for replarotomy were segregated into the following seven groups.

1. Problem because of an error in the original diagnosis.
2. Due to incorrect or inadequate operation done previously.
3. Because of a second disease which has developed due to the previous surgery.
4. Re-oeprative due to technical error or problem during the previous surgery.
5. Problem because some previous popular procedure was found inadequate or flawed.
6. Whether the problem is one of the commonly encountered complication of any abdominal surgery.
7. Whether it was a part of a staged procedure.

The details of all the reoperative cases were collected using a standard proforma and the analysis of the collected observations done.

The observations derived from the analysis of the above cases and the conclusion derived from it are given in the following pages along with a detailed discussion on management of the commonly encountered reoperative problems.

PROFORMA

Name Age Sex

I.P.No. Ward Address

Details of Previous surgery

Diagnosis

Surgery Done

Peroperative / post - operative complications

Time interval between two surgeries

Details of reoperative surgery

Indication for relaparotomy

Condition of the patient

Elective / emergency

Findings

Procedure done

Per-operative complications

Post-operative period

Outcome

BASIC CONSIDERATIONS IN REOPERATIVE ABDOMINAL SURGERY

ANATOMICAL CONSIDERATIONS

The abdominal wall anatomy in an anteroposterior orientation includes the skin, subcutaneous fat of variable thickness and anterior and posterior fasical envelopes with one or more muscles in between, properationeal fat and finally mesenchymal layer of peritoneal lining.

The blood supply of subcutaneous fat is the least among the abdominal wall components. Accordingly, bacterial contamination of the subcutaneous fat represents the anatomical focus for the development of most would infections leading to would dehisence.

The fascial blood supply arises from vascular branches from the underlying or overlying muscles. Thus incisions or combinations of incisions that compromise muscular blood supply reduce the arterial perfusion to the associated fasica.

The abdominal wall incision and its associated complication may itself lead to certain re-operations. The continuum of postoperative abdominal wall complications range from single would dehiscence to necrotizing fascitis.

Fascial separations may occur with or without infection (or) evisceration. One or two broken sutures may create a small area of dehiscence.

Unraveled knots, scored mono filament sutures that subsequently break are common causes of these complications.

Bacteriological Considerations in Re-operative surgery

Infectious complications of a recent laparotomy are probably the most mommon causes of re-operation. The pathogens of the peritoneal cavity stem primarily from the intestines and the bacteria inhabiting these hollow organs. The types of intestinal flora are determined by the patient's age, diet, previous surgery, nutritional status, gastric acid, bile salts, gut motility, immunological status, prior administration of antibiotics and other factors.

Normally there are fewer than 1000 bacteria / mm^3 in the esophagus and stomach. No obligate anaerobes but α - hemolytic streptococci, lactobacilli, yeasts and some oral bacteria. There is a direct correlation between the pH of the stomach (normally 2-3) and the bacterial count. In achlorhydria and gastric cancer patients, the count ranges from 1,00,000 to 10 million / ml. Anaesthesia reduces the gastric acid secretion and raises the microbial count.

Within the duodenum and jejunum there are 100 to 10,000 bacterial / ml, primarily streptococci, lactobacilli and transitory oral flora and in few cases, enterobacter species and bacteroides species.

With decreasing distance from the ileocaecal valve, the bacterial count reaches values of upto 10,00,000 to 1,00,00,000/ ml. Lactobacilli and

streptococci predominate. Bacteriodes species and enterobacter species are found in equal distribution in the terminal ileum.

60% of dried faecal matter is bacteria. Less than 0.3% of these bacteria are enterobacteria. Holdemann & Moore have listed 400 - 500 species of bacteria. The total bacterial count is 3.8 x 10^{12}-10^{14}/mg dry stools including in particular streptococci, Bacillus species, enterococci, E.Coli, Bifidus, anaerobic cocci, eubacteria, clostridia and bacteroides types.

PATHOLOGIC CONSIDERATIONS

Bacteria and other contaminants released into the peritoneal cavity (because of initial lesions like D.U. perforation, gengrenous bowel etc.) are rapidly disseminated by multiple influences of gravity and pressure gradients that are normally present in the peritoneal cavity. When the human body is upright, peritoneal fluid seeks a dependant position within the pelvis and when supine the subphrenic spaces and the paracolic gutter become dependant.

The dissemination of bacteria by normal movements of peritoneal fluid actually serves a non specific function of peritoneal host defense. This reduces the bacterial density within a given locale in the peritoneal cavity. It also increases the interface between the bacteria and the patient's defense mechanisms.

The host defense mechanisms within the peritoneal cavity are the phagocytic cells and the lymphatic fenestratons present in the diaphragmatic surface of the peritoneal cavity. The entire peritoneal cavity can be viewed as a giant lymphocele, peritoneal fluid is thus lymph fluid that is normally cleared via he lymphatic fenestrations. Bacteria are cleared by this mechanism. Obstruction of these fenestrations by fibrin and other debrios interferes with the peritoneal bacterial clearance and leads to subsequent abscess formation.

The physiologic consequnece of bacterial numbers are amplified by the local environment within the peritoneal cavity. Adjuvant factors, commonly encountered in the peritonitis patient may make a given inoculum of bacteria considerably more virulent than would customarily be the case.

Haematoma, seroma etc. are potent adjuvants for bacterial growth. The adjuvant effect may be attributable to the important value of ferric iron as a bacterial growth factor or it may relate to a leucotoin elaborated by the bacterial metabolism of haemoglobin.

A haematoma within the peritoneal cavity after an operative procedure may be the basis for abscess formation. A contaminated clot within the pelvis or the subphrenic space becomes the substrate for bacterial proliferation.

Both dead tissues and foreign bodies may be adjuvants for bacterial proliferation. Both materials probably represent havens for bacterial contaminants that are not accessible to phagocytic cells. Dead tissues from

excessive `bites' on omentum and other tissues that are strangulated by suture ligatures or from excessive use of electrocautery intra - operatively are commonly being identified as being of significance in the pathogenesis of would infection and also of intrabdominal abscesses and ultimately be responsible for drainage procedure that are needed.

Postoperative peritonitis is a constallation of illnesses with varying degree of phyislogical consequences. They depend on the total number of viable organisms within the peritoneal cavity and the efficiency of the host response to that bacterial assault.

The natural history of intra abdominal infection represents the biological interaction of host defenses and the infecting organism. Consequent to the interaction, the infectious process either resolves or fulminant peritonitis occurs and the patient dies. Not uncommonly a biological stand off develops between the elements of peritonitis occurs and the patient dies. Not uncommonly a biological stand off develops between the elements of peritoneal host defense and the summed influences of the bacterial infection. It is in this latter setting that reoperative surgery has its greatest likelihood of making a difference between survival and death.

POSTOPERATIVE INTESTINAL OBSTRUCTION

Adhesions and bands are the most common cause of post operative intestinal obstruction. Within two hours of operational trauma fibrinous

adhesions develop. According to the "Classic Concept" a loop of intestine adheres to the damaged serosa by fibrinous exudation. This fibrin gets reabsorbed completely or becomes organised by the in growth of fibroblasts to develop into established fibrous adhesions. According to the modern concept, fibrous adhesions develop in relation to areas of ischemia and vascular in growth occurs in to the ischaemic tissue. When the ischaemic crisis is over the vascular collateral aberrants resorb leaving a fibrous matrix. Volvulus and intussusception are also common cause of complicated intestinal obstruction in the early postoperative period.

SYSTEMIC COMPLICATIONS OF REOPERATIVE SURGERY

The inflammatory reaction of the peritioneum implicates the significant sequestration of fluid in the peritoneal cavity. The total surface area or peritoneum measures 2 m^2 of which 1-1.4 m^2 represents to the thickness of 3 mm results in a fluid loss of 5 to 8 litres from the entire organism. This leads to an initial hypovolaemic shock followed by dehydration, toxin induced shock and even death. Hypoxia is the basis of all the pathophysiological mechanisms. It occurs as a result of circulatory insufficiency, reduced supply of oxygen, reduced pulmonary oxygen transport, reduced nutritive perfusion and reduced oxygen delivery to the tissues.

This hypoxia is accentuated due to decreased respiratory efforts in a reoperated patient due to decreased abdominal muscular action and pain. These

complications affect all the major systems of the body leading to various complications.

In the cardiovascular system it leads to tachycardia, decreased circulation time and venous return with increased peripheral pooling and shock. Respiratory system is affected due to increase in pulmonary resistance, increase in oxygen transfer distance and pulmonary insufficiency. The reduced renal perfusion in the presence of hypovolaemia, increased intra abdominal pressure and augmented build up of toxic metabolities leads to toxic damage to renal epithelium leading to renal failure. In the gastrointestinal system local hypoxia with reflex sympathetic activity leads to reduced perfusion, bowel distension and influx of toxins into circulation. The increased intra - abdominal pressure due to distension has negative impact on pulmonary and renal function.

CRITICAL CARE THERAPY IN RE-OPERATIVE SURGERY

The postoperative care of a multiply operated and septic abdomen is similar to that of any major surgical procedure.

The patient with a septic response and abdominal re-operation must have intravascular volume support and inotropic cardiovascular support. Because of the increased vascualr capacitance due to septic response and third space fluid loss from increased surgical dissection, volume requirements in the post-op period for these patients are greater. Older patients and those with other

co-morbid conditions required placement of a Swan - Ganz catheter to monitor pulmonary wedge pressure and cardiac output more effectively.

Postoperative blood transactions are often required in these multiply operated patients. The issue of viral diseases and immunosuppression from blood transfusion has resulted in a significant re-evaluation of haematocrit threshold for blood administration. Postoperative ventilatory support is also essential in these reoperated patients.

Regarding nutritional support, current trends reflect a greater emphasis on enteral rather than parenteral means of protein calorie delivery. Feeding jejunostomy can often be used as a nutritional access during reoperative procedure depending on the anticipated period of recovery.

RE-OPERATIONS - DECISION MAKING IN EMERGENCIES

Detection of acute or chronic postoperative complications within the abdomen is a unique challenge because of the difficulty in making a precise clinical diagnosis.

Acute abdominal conditions worsen with time, with rapidly progressive impairment of oxygenation, cardiovascular function and intravascular volume. Peritonitis developing as a result of an aggressive would infection or an anastomotic leak may set the stage for multiorgan failure.

The judgment to reoperate is a critical one. The previous operation is to be reviewed critically in an unbiased manner. Fatigue and disbelief may be enemies in the judgemental process involved in the detection and management of abdominal complications.

The focal point in the entire process of decision making is the decision for or against a relaparotomy. Re-operations cause both diagnostic and therapeutic dilemmas. Tolerable limits are set for the disordered physiology. The progress of the patient is assessed by close monitoring.

The physical examination of a post-laparotomy patient causes a lot of uncertainty. Because the principal findings of acute abdomen, tenderness and rigidity are normally present due to the pain of the incision and the peritoneal irritation already present. In the early hours after a major abdominal procedure the effects of anaesthesia attenuate the patients response to pain and the physiologic response to hypovolaemia and hypoxia. The physiologic reserves available to the patient to respond to an acute complication is thus diminished. The patient may develop progressive toxaemia and shock before the gravity of the situation is realized. Despite these practical contraints a decision to reoperate has to be made most often clinically. The radiologic imaging and other investigations though are of assistance does not alter the actual decision making process.

APPROACHES AND TECHNIQUES FOR RELAPAROTOMY

Any re-operation in the abdomen poses more problem to the surgeon than the previous one. Depending on the demographics of a hospital re-operation will follow 1% to 15% of laparotomies. The overall mortality is higher and death is frequently due to persisting sepsis or peritonitis from the first procedure or due to multi system organ failure.

Each re-operation requires multiple decisions about various options. Correct decision can title the odds in favour of success. The surgeon should always consider alternative nonoperative or interventional technique to overcome the problem whenever possible.

Several broad questions should be asked before planning the technique approach to the re-operation.

1. Did the problem occur because there was an error in the original diagnosis?

2. Was an incorrect or inadequate operation done for the correct diagnosis?

3. Are these problems because of a second disease that has developed as a consequence of the primary operations?

4. Is the postoperative problem because of a technical error or problem during the first operation?

5. Are these problems because some popular procedure in the distant past has now proved to be inadequate?

6. Is he problem one of the commonly recognized problem of abdominal operations?

The following steps should be systematically reviewed when a decision on re-operation is made.

1. Proper patient position

2. Adequate lighting

3. Incision - optimal exposure and minimal damage

4. Knowledge of various dissection technique

5. Use reliable techniques for closure

PLACEMENT OF INCISIONS

A re-operation is most often conducted by opening through the previous incision. If a new incision is selected then there must be a justifiable trade-off of reduced risk or technical difficulty against increased damage to muscular

innervation, blood supply and the additional unsightliness of another healing wound.

DISSECTING TECHNIQUES FOR REOPENING THE ABDOMEN

After a thorough review of the patient's previous operation selecting the proper position, lighting and instruments it is important to review a few questions to guide the direction for reopening he abdomen.

1. What arrangement of viscera, loop, conduits etc., might be underlying the abdominal wall?

2. Is there a distended, damaged, inflamed bowel underneath?

3. Were large areas of peritoneum removed or denuded at the previous surgery?

4. What type of adhesion might be encountered in the area of old incision?

At Zero to five post operative days without infection, one might expect non vascualrized soft fibrous adhesions that are easily separated with blunt dissection or by gentle squeezing between the fingers.

At Five to ten post-operative days, firmer adhesions develop that have capillary vascularity. They can be quite firm and require sharp dissection.

Inflammed areas may be quite woody and thickened with inflammatory exudate. Anatomical landmarks will be obscured or obliterated.

At Ten to thirty days postoperatively there is a vascularized proliferative fibroplasias that is firmly adherent and difficult to dissect. Separation of structures requires careful sharp dissection.

At Thirty to ninety days the vascularity begins to decrease. The fibroplasia is slowly remodeled, becomes thinner and is gradually resorbed.

By 90+ days gradual remodelling has converted most adhesions to no more than diaphanous light structures. One can anticipate using both blunt and sharp dissection. Experienced surgeons find it easier to avoid problems by using sharp dissection.

Some tactics help to gain wide exposure to the abdomen without causing inadvertent enterotomy.

1. Begin at a point outside the area of previous incision, if possible. One or 2 cm beyond the wound there is usually a cleaner area with lighter or no adhesion.

2. Seek a clear plane with identifiable fascial and peritoneal layer outside the previous incision. Dissect on the peritoneum for a short distance on both sides laterally. Then sneakup on the more

dense attachments. Sharply detach the firm adhesions and then extend the fascial incision over that area.

3. When the wound have been fully opened in the long direction, attention should then be paid to freeing the attached omentum and viscera from the parieties for 3 to 5 cm laterally. Overenthusiastic placement of traction and tension in the early exposure may forcibly tear the bowel wall adherent to the parieties. The dissection is carried out on the peritoneal surface leaving the omentum on the viscera for later dissection.

HELPFUL ADJUNCTIVE MEASURES FOR ABDOMINAL RE-OPERATTION ARE :

* Preoperative bowel de-compression - Much of the air that distends the bowel is swallowed. If there is bowel distension it should be decompressed by continuous nasogastric suction.

* Intraoperative decompression is the best protection for prevention of damage to distended bowel and prevent spillage.

* Prevention of inadvertent enterotomy - Distended bowel is more vulnerable to injury. Spillage of contents raises the threat to the patient's condition. Very little additional tension from the rough handed dissection cause torn bowel and leakage. In inflamed and edematous

tissues, the usual dissection planes are weakened and obscured. Extra efforts must be made to stay in the proper plane. Also one should take care to support distended loops from hanging over the edge of the wound, which causes venous congestion, increases edema and decreases arterial perfusion.

In short, the dissection in all reoperative surgery must be done with extra ordinary care. It is no place for an impatient surgeon nor for one with title experience. The need for re-operation tests the resolve, skill and the intellectual resource of the surgeon.

RE-OPERATIONS FOR INTESTINAL OBSTRUCTION

Small bowel obstruction is defined as a partial or complete interference with the passage of stool distally in the small intestine. It is one of the more common acute abdominal emergencies and is associated with significant morbidity and mortality especially if it progresses to bowel ischemia.

In the western countries, the commonest cause of small bowel obstruction is adhesions usually secondary to prior abdominal operation. Other causes of adhesions are (1) congenital (2) prior blunt trauma and (3) inflammatory processes within the abdomen. Adhesion formation appears to be especially frequent following gynaecologic surgery, abdominal colectomies, APER etc.

Intra peritoneal adhesions are classified into :

1. Congenital
2. Acquired
    a. Post operative
    b. Post inflammatory

Today, acquired adhesions are the most common cause of small bowel obstruction. They are classified into four types.

Type I Postoperative fibrinous adhesions (Bread and Butter adhesions). This type commences between the third and sixth post operative days. These adhesions are unlikely to produce complete obstruction.

Type II Postoperative fibrous adhesions are strong bands and occur at a site where an abdominal organ is deprived of blood supply and becomes adherent to the omentum or parietal peritoneum in order to gain an additional blood supply. They can give rise to intestinal obstruction any time after any abdominal operation.

Type III Adherence of a loop of intestine to an inflamed intra peritoneal structure eg. Tuberculous mesenteric node etc.

Type IV Follows chemical irritation from materials such as talc, glove powder etc. entering the peritoneal cavity.

In practical terms, the surgeon encounters only two types of adhesions, the easy and the difficult one. Easy ones are flimsy adhesions which can be easily divided and separated from the intestine without damage.

Difficult ones are those which have to be separated from the intestinal wall by sharp dissection, a process often associated with inadvertent perforation.

Cause of intra pertioneal adhesions

(1) Ischemic areas - sites of anastomosis, reperitonealization (2) Foreign - bodies - talc, starch granules, gauze lint etc. (3) Infective diseases - peritonitis, TB etc. and Inflammatory disease - Crohn's Ulcerative colitis etc.

Peritoneal healing and adhesion formation

The process of healing of a divided peritoneum is a fascinating process that is quite different from that of a cutaneous would. In the first day or two, a fibrinous exudate covers the defect which is infiltrated by monocytes, hisiocytes, and polymorphs. By the third day, dramatic changes take place in which the would surface becomes covered by a continuous layer or cells that closely resemble a new mesothelium. The would itself is invaded by fibroblasts and by the fifth day after injury, the surface layer of flattened cells resemble the adjacent normal peritoneum and lies on thick layer of underlying fibroblaste. By two weeks there is nothing to find, except a thin layer of fibrous tissue covered by a smooth mesothelium at the site of original defect.

The theory that fibrinous adhesion develop in relation to areas of ischemia and represent vascular grafts into such tissues, explains the good majority of instances in which acquired adhesions are found within the peritoneal cavity. Adhesions that form to the line of bowel anastamosis or to a laparotomy scar can be explained by the strangulating effect of the sutures on local tissues in such situations. It is well recognized that a laparotomy

performed, some time after an episode of general peritonitis when we know that the abdominal cavity wound have been coated with a fibrous exudate, usually reveal very little in the way of wide spread adhesions, yet the strands that are present are localized to those areas where intense tissue anoxia occurred, for example to the appendix after an attack of acute appendicitis or to the gallbladder after an episode of gangrenous cholecystitis.

Pathogenesis of intraperitoneal adhesions

There is first hyperemia and edema of the inflammed serosa which is followed by rapid deposition of fibrin. Involved surfaces may adhere together by means of an inflammatory exudates and polymorphonuclear infiltration. Fibrinous exudates fails to be dissolved by enzymes of leucocytic or peritoneal origin and organization may occur, with the growth of blood capillaries and fibrblasts and the development of an estbalished fibrous adhesion.

A second mechanism has been proposed. It requires two steps. A serosal injury which may be missed and the haemorrhage which will cause blood clot on the injured area and form the adhesion.

Methods by which adhesions produce obstruction

1. Commonest is by angulating the bowel in relation to some fixed point - say the abdominal wall or a focus of infection.

2. A long strand of fibrous tissue or length of adherent omentum can occlude a loop of gut producing a closed loop or strangulating obstruction.

3. An adhesive band can lead to volvulus of a loop by acting as a fixed point around which a loop may rotate.

Other factors which increase adhesion formation are :

a. Ischemia

b. Decreased levels of plasminogen activator in the damaged peritoneum

c. Infection

d. Radiation induced endarteritis

e. Foreign body reaction

f. Thermal injury

Treatment of adhesive obstruction

It is a very good general rule that acute small bowel mechanical obstruction is an indication for urgent surgery. Obstruction due to adhesion however provides two common examples of reserved qualifications to this rule.

First it is not uncommon to see a patient, few days after a major abdominal surgery which has been complicated by a severe ileus who complains of abdominal pain and whose previously silent abdomen now reveals peristaltic sounds. In such circumstances a period of doubt exists with uncertainty whether these signs represent a recovering ileus soon to be rewarded by passage of flatus or the first stage of development of a mechanical bowel obstruction. Under these conditions obviously one must continue conservative treatment and keep a watchful eye on the situation.

The second indication is in the patient who has suffered repeated previous episodes of intestinal obstruction with several previous operations for adhesiolysis. These group of patients should also be managed conservatively.

CONSERVATIVE MANAGEMENT

It consist of

1. Fluid management
2. ABG & Electrolytes estimation
3. CVP measurements
4. Urine output monitoring
5. Restore Plasma Volume
6. Intestinal decompression

Factors associated with a greater likelihood of success with long tube decompression include.

1. Incomplete obstruction

2. Recurrent obstruction

Complete intestinal obstruction secondary to adhesions is less likely to respond to non - operative treatment.

It is mandatory that any patient who is treated expectantly undergoes serial physical and radiologic examination for the early detection of signs of failure like increased tenderness, occult metabolic acidosis, leucocytosis, fever, tachycardia etc.

Operative management

1. Re open through old wound unless this is obviously anatomically not suitable.

2. Peritoneum should be entered cautiously lest a loop of gut be breached.

3. Use sharp dissection and blunt dissection as needed.

4. As adhesions tent up the lumen of the bowel great care is needed to avoid a sudden gush of obstructed content.

PREVENTION OF RECURRENT ADHESIONS

Many electric treatments have been proposed for the prevention of adhesions. Most however have shown little consistent effect. Some investigators have attempted to decrease fibrin deposition by the use of heparin

or dextran. Others have attemped to accelerate the removal of fibrin exudates with such adjuncts as peritoneal lavage, enzyme therapy and fibrinolytic agents. Still others have approached the problem mechanically and have attempted to separate the surfaces of serosa with insaillation of lubricants, oxygen etc. All these have not given consistent results.

The possible things an operating surgeon can do are :

1. Minimalization of tissue handling
2. Use of non absorbable (or) delayed absorbable sutuures rather than absorbable reactive catgut.
3. Use of greater omentum to cover the abdominal incision and intestinal anastomosis.
4. Avoidance of foreign bodies such as talc, glove powder, gauze lint etc.
5. Repositioning of abdominal contents in an anatomically appropriate manner.
6. Meticulous hemostasis.
7. Avoid mass ligation whenever possible.
8. Efforts to reperitonalize by dragging edges and strangulating them should be avoided.

ABDOMINAL WALL CONSIDERATIONS IN REOPERATIVE SURGERY AND BURST ABDOMEN

In most of the re-operations the previous incision was the preferred site of re-entry. Because re-operations usually involved the anatomic structures and sites that was the focus of original procedure the exposure afforded by the original incision usually proves adequate. Depending upon the interval between the relaparotomy and previous laparotomy the adhesive attachments of omentum and intestines may or may not be extensive or difficult to disrupt when approached through the original incision. Finally, acute re-operations through the original incision will take advantage of the healing process that has already transpired. The following statement though controversial sounds appealing. A 7 day old surgical wound which is opened and closed remains a 7 - day wound at the time of closure. It does not revert to being a fresh wound as the process of healing is already in progress. The selection of reoperative incision in the abdomen is of considerable significance to avoid serious morbidity during the patient's subsequent convalescence. In acute re-operation usually the previous incision is preferred.

The reoperative wound in all the patients were closed primarily. Mass closure of the wound was always preferred. It is fully realised that healing of the incision takes place by formation of a dense fibrous scar that unites opposing faces of a laparotomy wound en masse. The purpose of the suture is

to hold the wound edges and to act as a splint while this dense fibrous scar deposits and matures.

Acute re-operation is commonly indicated because of intra abdominal infection due to contamination. Hence closure of abdominal wound completely may not be desirable. Wounds reopened for non - infectious indications are also at increased risk for infection, dehiscence, evisceration and even necrotizing fascitis. Thus delayed primary closure may prove desirable for reoperative wounds in the acute situation.

Advantage from prior days of the healing process that are gained by using the same incision is lost if the subcutaneous tissue and skin are left open for delayed closure.

WOULD DEHISCENCE AND BURST ABDOMEN

Wound dehiscence and burst abdomen are serious complications of laparotomy and are the commonest indication for re-operation.

Wound ischemia, tension and postoperative infection are interrelated variables. Would ischemia begets infection leading to dissolution of the fascia and pull through of suture material. Wound edge ischemia from strangulating fascial sutures causes fascial necrosis, infection or both. Hence at the time of re-operation, the edges of incision are sub optimal for wound closure. The subcutaneous fat and fascial edges of the wound commonly required

debridement before approximation. Intra abdominal pressure due to ileus etc set the stage for dehiscence.

Most surgeons have abandoned the use of tension sutures for primary closure of abdomen. The tension sutures are reserved for the resuture of a burst abdomen.

Use of retention sutures with or without all the different supports that are employed may prevent evisceration of abdominal contents but do not prevent dehiscence.

In all the cases of would dehiscence requiring re-operation, mass closure of the abdominal wall was done. The technique of palisade closure and dynamic supporting suture were also followed.

The development of purulent necrotic material in the wound of the abdominal wall which spreads is most important early indicator of the occurrence of eventeration following laparotomy. Prophylactic prevention of postoperative sepsis in a wound is the most effective way of prevention of a burst abdomen.

When repairing dehiscence or evisceration suture repair alone will usually be sufficient. It fascial infection and necrosis were present appropriate debridement of the fascial layer back to viable bleeding tissue is done.

Inadequate debridement in he interest of trying to bring the fascia back together for closure leads to reseparation of the fascia.

Synthetic material like polypropylene can be used as a replacement for lost fascia. With synthetic meshes, the abdominal wall with necrotizing infection can be debrided fully without worry of defect. In selected cases when closure of the abdominal fascia is difficult a temporary mesh interposition will permit immediate closure. When the distended and edematous state of intestine has resolved, primary closure of the fascia can be achieved.

The problem mesh itself is relatively inert and does not foser infection compared to braided materials. The coarse weave of the mesh allows effective drainage to the exterior, hence this syntheic material can be used as a fascial substitute even when infection has been active within the abdomen. However necrotic elements of fascia and soft tissue should not be sewn into the mesh. The mesh should be covered prematurely with grafts or flaps when large concentrations of bacterial have harboured he mesh surface.

When mesh is used as a temporary substitute for the difficult abdominl wall closure because of intestinal distension but without fascial loss perse, the mesh can be removed 2 or 3 days later after the distension has subsided. The sutures are cut and the mesh removed. Primary fasical closure is completed. Delayed primary closure of the skin and subcutaneous tissues is done because of the inevitable contamination during temporary mesh presence.

When fascial losses secondary to infection and necrosis preclude primary closure, the mesh is left in situ. A confluent bed or red granulation tissue will then develop over the entire mesh . Full thickness flaps of skin and subcutaneous tissue are preferable to SSG. The flaps can be mobilized on one or both sides of the abdominal wall. Bilateral mobilization alone may be sufficient to allow midline closure over the granulation tissue.

In closure particularly difficult because of the size of the defect counter incisions on the flanks will create bipedicled flaps, which can be created on one or both sides of the abdomen. The bipedicled flaps are easily mobilized from the area of the countertraction to the edge of the granulating midline wound. The bipedicled flaps are displaced to the midline to close the abdomen with SSG being used to cover the skin defect on the flank.

RE-OPERATIONS FOR POSTOPERATIVE INRA - ABDOMINAL SEPSIS

Surgical patients have many causes for postoperative fever and infective morbidity of which intra - abdominal abscess is one of many. It is important to have an appropriate level of suspicion based on clinical suspicion that the patient has an intra abdominal focus of sepsis.

Almost every patient with postoperative peritonitis is at risk for abscess formation and all the patients with clinical evidence of infection / sepsis after the surgery should be investigated systematically for this complication.

The diagnosis of an intra - abdominal abscess is always elusive. First of all, signs and symptoms of postoperative infections from varying anatomic sites like respiratory system, genitourinary tract etc are all common and non - specific. The post laparotomy patient has a painful abdominal incision that hinders with the thorough physical examination of the abdomen. Patients with fever and leucocytosis are commonly placed on empirical systemic antibiotics at the least clinical provocation. Such therapy will commonly disguise the early findings of infectious morbidity which not only makes diagnosis more difficult but often delays the clinical presentation of infection that is in need of a proper laparotomy and drainage and not just antibiotics.

Abdominal roentgenograms may show :

1. Extraluminal air
2. Displacemen of gastric air shadow

3. Air-fluid interface

4. Retroperitoneal gas

However, the diffuse intestinal distension due to ileus secondary to the postoperative or septic state may obscure these findings.

Ultrasound imaging has the advantage of being less expensive and portable to the bed side which facilitates the examination of the patients under intensive care. On the other hand, the ultrasound probe should make continuous contact with the abdominal wall in order to achieve a good resolution. So in patients with open wounds and stomas on the abdominal wall (who are prone to develop abscesses) are not good candidates for sonographic diagnosis. In addition, the resolution of the ultrasound is compromised in patients with marked gaseous distension of the intestine. Finally ultrasound imaging does not provide the anatomic resolution that can be achieved with CT scan and also it is highly observer dependent.

Radio isotope imaging of the abscess using Gallium - 67 or Indium - 111 is no effective in the immediate post operative period, when patients still have peritoneal inflammation. The whole peritoneal surface will attract the isotope and every location which has been dissected including the wound itself will show isotope localization. Patients who are greater than two weeks postoperatively when the acute inflammation has subsided may benefit from these scanning techniques.

A firm diagnosis that is supported by an imaging study is not always available to the postoperative patient who needs re-operation. Indeed the patient may be harmed by unnecessary delays where the clinician is ordering multiple and repeated scans in an effort to confirm the diagnosis before a drainage procedure is undertaken.

Although the demerits of empirical operation have been debated there is definitely a role for re-operation when clinical examination shows a high probability of intra abdominal sepsis. The patient who has undergone an abdominal exploration for bacterial peritonitis, abdominal trauma with significant contamination and has continued septic features must be considered strongly for re-operation even though the CT scans and other radiological studies are equivocal or non diagnostic. It is not appropriate in such situation to continue with antibiotic therapy alone with the hope that all will end well.

In a study of intra abdominal abscesses, it was found that trauma and technical errors in the performance of surgical procedure were common causes of abscesses necessiating re-operation.

Any patient who has certain high risk operation must always be watched for sepsis in the postoperative period. Patients with esophageal anastomosis, duodenal stumps, pancreaticoenterostomy etc are suspect for a abscess formation.

Limited surgical approaches are preferred when the abscess is well localized. Flank or subcostal incision afford an extra peritoneal approach to draining a subphrenic abscess. Limited lateral abdominal incisions allow access to paracolic gutter abscess or pelvic collections with an extra serosal route of drainage that avoids recontamination of peritoneal cavity.

For abscesses which are centrally localized, reoperation through the original incision is necessary. Care is exercised to avoid inadvertent enterotomy. Gentle digital dissection of newly formed adhesions between loops and between intestine and the abdominal wall is the safest means of avoiding intestinal injury. Laparotomy pads and gentle pressure is the best method of management of the unavoidable small vessel bleed that accompanies the disruption of these fibrous adhesions.

The site of initial procedure is examined first. All suture lines are commonly inspected. Abscesses commonly occur in the anatomical drainage basins of peritoneal cavity. Thus subprenic space, paracolic gutters and the pelvic cavity are the most common locations for intra abdominal abscesses.

Interloop abscesses which are not uncommon, are most likely of be found in multiple operated abdomen due to false dependent position and slings of adhesions between loops of intestines. The decision to dissect every loop of inestine within the peritoneal cavity carries considerable risk and is pursued only when there is a high index of suspicion of an interloop abscess.

Gastro intestinal fistulae - location, fluid and electrolyte imbalance

Fistulae that occur in the postoperative period are a result of complications of bowel anastomsis and inadverttent direct injury to the bowel etc. Errors in surgical judgement are also important. A valid indication to operate and experienced intra - operative decision making can be just as important as technical ability. The operative pathology, the patient's co-existing diseases and other untoward systemic factors that may jeopardise the success of the operation are significant. The pathological status of the bowel may also worsen prognosis. Utmost care is necessary to avoid injury to the bowel and to provide a means to limit morbidity if such a complications should occur.

An external fistula forms a communication between the gastrointestinal tract and the skin. This is the most common type of postoperative fistula. Such fistula are associated with various amounts of losses of fluid, electrolytes and nutrients.

An end fistula occurs when there is a complete loss of intestinal continuity beyond the fistula. As the result, all the intestinal contents are expelled through the fistula. In essence, the fistula functions as an ostomy. This type of fistula almost never closes spontaneously and requires operative intervention for closure and re-establishment of intestinal continuity.

In a lateral fistula, the intestinal continuity is maintained both proximal and distal to the defect permitting progression of intestinal contents beyond the fistula.

Obstruction distal to the bowel wall defect in the form of adhesions, strictures and disseminated neoplasm are associated with higher morbidity. Spontaneous closure is usually impossible in the presence of obstruction and re-operation is required.

A single orifice external fistula arising from a single intestinal segment will close spontaneously. Multiple orifices on the skin complicate wound management. If this area is not managed approximately large abdominal wall defects may result. The are more serious and associated with a higher mortality than the single orifice ones. Spontaneous closure rates of multiple fistulae are low. Therefore re-operation is usually required.

The more proximal in GIT the origin of fistula, the greater the output. High output proximal GI fistulae are the most difficult to treat. The secretary functions of pancreas, biliary tract etc. results in large volume losses and the protein and the electrolyte composition of these secretions causes complex nutritional problems. Lower down in GIT, these secretions have time to get absorbed, hence decreasing the fluid, electrolyte and nutritional losses. Large bowel and low ileal fistulas tend to be of low output variety and they can often successfully be managed non - operatively.

Although septic complications are the most frequent complications of a large bowel fistula, the same tend to be well localized and amenable to minor surgical or non - surgical treatment. In addition, because the septic

complications are not associated with malnutrition, mortality rates are lower than in the most proximal fistulae. In contrast, sepsis associated with an upper tract fistula is of a more virulent type because greater volumes of contaminated fluid are released into the peritoneal cavity. The fluid will contain toxic bile acids and powerful digestive enzymes from the pancreas which lead to a more diffuse chemical peritonitis. If infection becomes established, the resulting lethal situation needs prompt attention. In fistulae associated with abscess cavity, infected material tends to collect adjacent to the bowel wall defect preventing adequate healing of this defect. These fistulae rarely undergo spontaneous closure and uncontrolled sepsis may result in a higher mortality rate.

LAPAROSTOMY

(PLANNED MULTIPLE RE-OPERATIONS)

Advances in ICU treatment which are based on better understanding of the pathophysiology of wound healing form the foundation for the approach of multiple planned relaparotomies, called Etappenlavage. Etappenlavage or planned relaparotomy represents the planned approach to re-explore the patients abdomen at regular intervals after the original corrective operation. This ensures the gentle elimination of the infected source and promotes maximal reduction of toxic necrotic material by daily abdominal cleansing. Intra abdominal complications are immediately recognized and immediate repair effected. The planned replaparotomy differs from leaving the abdomen open in that it is rarely complicated by fistulae. The abdominal cavity is not closed by suturing the fascia. Instead different devices are used to cover the abdominal cavity to contain the intra - abdominal organs which frequently becomes distended. In addition, primary intra - abdominal anastomiss can be done. Diversion colostomies are less frequently required and no longer prolonged the patients recovery period. Necrosis occurring in the anastomosis due to infection, gangrene etc. especially on retroperitoneal organs can be recognized at an early stage and treated accordingly. The concept of etappen lavage is extremely flexible allowing for adaptation of the strategies during the progression of the disease. In comparison, the concept of single operation forfeits immediate reaction to pathological process.

In a planned relaparotomy, the septic focus within the abdominal cavity can be easily cleared. The abdominal cavity is cleaned by lavage with 8-10 litre of saline. The source of infection is identified and proper procedure done to prevent further delivery of bacteria, toxins and necrotic tissues into the peritoneal cavity. Anastomosis can be done primarily as their healing can be monitored during subsequent replaparotomies.

An artificial burr like device was used to facilitate temporary abdominal closure. The burr consists of two adherent sheets of polyamide and polypropylene which are trimmed to accommodate any wound. Each of the artificial burr is sutured to the opposing fascia. The sheets can be easily separated to open the wound. The artificial burr is closed. The large gap between the wound edges accommodate the intra abdominal organs without undue pressure and the abdomen is relaxed and impairment of rental, respiratory and hemodynamic function is avoided.

In a planned re-operation the burr is opened easily by peeling off the hook side. The abdominal cavity is inspected and lavage done.

At the last relaparotomy when most of the dead tissue are removed, the abdomen is sepsis free and good intestinal mobility is present, the facial edges are approximated, the burr removed and the abdomen closed definitively without drainage.

The patient is cured of his disease and the surgeon is confident that the problem is solved and the need for unplanned intervention is reduced.

The indications for etappen - lavage or planned relaparotomy are :

1. General condition of the patient is poor precluding any definitive procedure.
2. Expected continuing source of infection
3. Expected progressive necrosis
4. Bowel ischemia
5. Excessive peritoneal edema
6. Uncontrollable haemorrhage and packing

To facilitate temporary abdominal closure and reopening, several ingenious techniques have been promoted. Retention wires were used. The zipper first employed in surgery by straues, was sucessfully sutured to the facial edges for temporary facial closure.

THE ADVANTAGE OF PLANNED RELAPAROOMY ARE

1. Assured elimination of the cause
2. Effective reduction in the bacterial contamination

3. Assured elimination of toxaemia

4. Flexible therapeutic options

5. Timely diagnosis and management of complications

Hence in extremely advanced stages of peritonitis in a debilitated unstable patient planned replarotomy helps to achieve maximal clearance of the inflammatory process at planned regular intervals rather than unplanned re-operation which puts both the patient and the surgeon in a state of insecurity.

OBSERVATION AND DISCUSSION

Under the study, total of 50 cases of re-operative abdominal surgeries done during the period of 24 month (June 2004 to June 2006) were taken for observation and analysis. The following are the observations derived from the analysis of the above cases.

TABLE - 1

INDICATION FOR PREVIOUS SURGERY

Sl.No.	Indication for previous surgery	No. of Cases	Percentage
1.	Obstetric & Gynaecological Surgery	15	30%
2.	Perforation / Peritonitis	12	24%
3.	Intestinal obstruction	5	10%
4.	Trauma	4	8%
5.	Incisional Hernia	3	6%
6.	Peptic ulcer disease surgery	3	6%
7.	Large bowel obstruction	3	6%
8.	Cholecystectomy	2	4%
9.	Appendicitis	1	2%
10.	Malignancy	1	2%
11.	Not known	1	2%

TABLE - 2

INDICATION FOR RELAPAROTOMY

Sl.No.	Indication for operative surgery	No. of Cases	Percentage
1.	Adhesive obstruction	14	28%
2.	Burst abdomen	11	22%
3.	Ostomy closure	9	18%
4.	Obstructed incisional hernia	5	10%
5.	Intra - abdominal abscess	4	8%
6.	Anastomotic leak	2	4%
7.	Reperforation	2	4%
8.	Peptic ulcer disease complication	1	2%
9.	Ostomy revision	1	2%
10.	Malignancy	1	2%

ADHESIVE OBSTRUCTION

Of the 50 relaparotomies performed during the study period, Adhesive obstruction was the leading indication for re-operation constituting 28% of all reoperations. Of the cases of adhesive obstruction, the commonest previous surgery performed were obstetrics and gynaec procedures.

Hollow viscus perforation was the next common first surgery performed followed by appendix.

Adhesiolysis was alone done in almost 58% of cases. Adhesioloysis with resection and anastomosis of small bowel was done in 35% of cases. The common pahtology requiring resection of small bowel was the adhesive band causing structure or knotting of bowel or due to small bowel injury which required resection of the injured past.

TABLE - 3

ADHESIVE OBSTRUCTION

Sl.No.	Adhesive Obstruction	No. of Cases	Percentage
Previous Laprotomy			
1.	Obstetric & Gynaec. procedures	9	64.28%
2.	Ileal Perforation	2	14.28%
3.	Duodenal perforation	1	7.15%
4.	Appendix	1	7.14%
5.	Not Known	1	7.14%
Procedure Done			
1.	Adhesiolysis	8	57.14%
2.	Adhesiolysis with Resection and Anastomosis of small bowel	5	35.71%
3.	Adhesiolysis with omentectomy	1	7.14%
Complications			
1.	Small bowel injury	1	7.14%
2.	Mortality	NIL	

TABLE - 4

BURST ABDOMEN

Sl.No.	Burst Abdomen	No. of Cases	Percentage
1.	Following emergency laparotomy	7	63.63%
2.	Following elective laparotomy	4	36.36%
Previous Surgery			
1.	Surgery for peritonitis	5	45.45%
2.	Obstetric & Gynaec. procedures	2	18.18%
3.	Surgery for incisional hernia	2	18.18%
4.	TVGJ	1	9.09%
5.	Intestinal obstruction	1	9.09%
Outcome			
1.	Discharge	8	72.72%
2.	Morality	3	27.27%

The next common indication for re-operation was burst abdomen consituting 22% of all re-operations. The occurrence of burst abdomen following elective and emergency surgery were 36% and 64% respectively of total number of cases of burst abdomen.

Surgery for peritonitis was the commonest cause for burst abdomen followed by surgery for obstetrics and gynaec procedures and surgery for incisional hernia.

The mortality following burst abdomen was 27%.

OBSTRUCTED INCISIONAL HERNIAS

Total number of 5 cases of obstructed incisional hernia were reoperated. Incisional hernia repair is one of the common surgeries performed in the general surgical department but obstruction is relatively rare. All the cases of obstructed hernias were females and the most common previous surgeries performed were LSCS and Abdominal Hystrectomy.

The high incidence in females may be due to various reasons like lax abdomen obesity and weaker abdominal wall musculature due to repeated pregnancies. The other important factor is the use of absorbable suture material in the abdominal closure in LSCS and Abdominal hystrectomy which does not provide the prolonged support required for the proper healing of the fascial layers of the abdominal wall. One other factor may be the lack of proper post partum abdominal supports and exercises to the musculature.

TABLE - 5

OBSTRUCTED INCISIONAL HERNIA

Sl.No.	Obstructed incisional hernia	No. of Cases	Percentage
Previous Surgery			
1	LSCS	3	60%
2.	Abdominal Hystrectomy	2	40%
Procedure done			
1.	Adhesiolysis with resections & anastomosis of small bowel	2	40%
2.	Adhesiolysis	2	40%
3.	Adhesiolysis with omentectomy	1	20%
Complications			
1.	Wound Infection	2	40%
2.	Mortality	1	20%

All the cases of obstructed hernia had omentum which was adherent to sac and small bowel loops as contents, omentectomy was done in 20% of cases.

Resection and anastomosis of small bowel was carried out in 2 cases which were due to non - viability of bowel.

INTRA ABDOMINAL ABSCESSES

Intra abdominal abscess as a seperate entity leading to re-operation constituted about 8% of cases. Intra abdominal inter loop abscess were found as part of various findings in cases of intestinal obstruction, liver injury etc. There were totally 4 cases of intra abdominal abscess which required relaparotomy.

TABLE - 6

RELAPARTOMIES FOR INTRA ABDOMINAL ABSCESS

Sl.No.	Initial Diagnosis	Surgery done	Relaparotomy findings
1.	GB Calculus	Cholecystectomy	Sub-hepatic abscess
2.	Liver injury	Packing and pack removal on 2nd day	Sub-diaphragmatic abscess
3.	Intestinal obsruction	Mesentric node biopsy	Retroperitoneal abscess
4.	Intestinal obstruction	Ileal Resection & anastomosis	Intra abdominal abscess

The most important cause leading to intra abdominal abscess formation was improper hemostasis and intra peritoneal hematoma which lead to infection. Proper hemostasis and thorough peritoneal wash could have avoided these infective complications.

TABLE - 7

COMPLICATIONS OF RELAPAROTOMY

Sl.No.	Per operative complications	No. of Cases	Percentage
1.	Adhesions	32	64%
2.	Abscess	4	8%
3.	Small bowel injury	1	2%

TABLE - 8

COMPLICATIONS OF RELAPAROTOMY

Sl.No.	Post operative complications	No. of Cases	Percentage
1.	Wound dehiscence	5	10%
2.	Mortality	7	14%
3.	Septicemia	14	28%
4.	Enterocuaneous fistula	1	2%

Although every effort is made to get a complete pre-operative work up and surgeries are performed under expert guidance, technical errors and lapses of workup do occur though rarely.

A case of chronic DU with ulcer in lesser curve was operated without HPE report. It latter turned out to be a gastric carcinoma which was inoperable palliative anterior GJ was done.

Thus in summarizing the above observations, most of the reoperations could have been avoided if following precautions were taken.

1. Thorough preoperative workup, nutritional support.

2. Careful dissection pre-operatively and use of proper closure techniques.

3. Judicious post-operative care with prophylactic measures against sepsis and malnurition.

Thus with the above measures, the added stree of re-operation on both the patient and the surgeon could be avoided and result in a better out come.

CONCLUSION

Abdominal surgeries (both elective and emergency) are done with view to cure the disease or give maximum benefit to the patient in the form of relief of symptoms.

Unfortunately even with the best of intentions and good surgical care, there are instances in which patients need re-operation some times even before they leave the hospital from the primary surgery, or some times year later due to some complications. The cause for re-operation are many - the concomitant disorders, the emergency operations and the operations for abdominal trauma being significant risk factors. Such a situation puts the patient in greater agony, anxiety and uncertainty of the outcome. The surgeon becomes more worried about the problem and less clear over the outcome.

As a surgeon in training, the analysis of such cases has been done with a view that it will throw some light as o their causes, possible ways of prevention, available methods of management and the final outcome so as to be better prepared when we are likely to meet such unexpected instances in future. All such cases, both elective and emergency re-operations operated in the surgical units of this institution from June 2004 to June 2006 were analysed with the above idea in mind.

There were 50 cases requiring relaparotomies during this period of which 14 cases were elective and 36 cases were taken as emergency. Clinical

Judgement rather than investigative modalities had an important role to pay in the emergency relaprotomies. Entry through the previous wound was always preferred for re-laporotmy.

Adhesive obstruction constituted 28% of the cases requiring re-operations. The dividing line between ileus and mechanical obstruction being marginal, regular checkup, evidence of increases peristasis, persistence of distended loops in x-ray even after conservative management and decompression make us decide in favour of mechanical obstruction. Needless to say, proper fluid management and correction, of electrolyte imbalance helps in recovery of the patient and preventing systemic complications.

The next common indication for re-operation was burst abdomen. It is neteworthy that most of cases were either emergency laparotomies or chronic abdominal condition with associated poor nutrition, less than ideal preparations and concomitant diseases as the predisposing factors. Prompt recognition and resuturing with adequate attention to the wound management has saved most of the patients. Those patients who could not be saved had either severe underlying sepsis, malnurition or both.

The incidence of obstructed incisional hernia is especially higher in the female population with the maximum incidence in previous LSCS scar. The preference of absorbable suture materials for LSCS closure and weaker

abdominal wall leads to the formation of incisional hernia and obstruction in these cases.

The other common indication for emergency relaparotomy was for intra - abdominal sepsis. It is noteworthy that most cases of intra abdominal sepsis followed bowel resection and anastomosis. Contamination of peritoneal cavity with infected intestinal contents in an acutely ill debilitated malnourished patient formsan ideal condition for infection to manifest and spread. The other common cause for intra abdominal sepsis is following visceral injuries or surgeries in which bleeding where persistent and the resultant leak of blood into the peritoneal cavity forming an ideal medium for bacterial growth.

Most of the cases of anastomotic leaks have succumbed despite the re-laparotomy. Post general condition, extensive peritonitis, edematous and friable edges of the bowel could have been the contributory factors.

In the case of elective relaparotomies most of the cases fall under following categories.

1. One of the complication of previous surgery.

2. Incomplete (Planned or inadvertent) surgeries done previously.

3. Technical errors of previous surgery

4. Missed or wrong diagnosis at previous surgery.

Most of them could have been avoided if proper care has been taken in the previous surgery or complete preoperative workup has been done before the previous laparotomy. The added morbidity of relaparotomy on the patient and doubt it creates in the surgeon's mind about his ken could be avoided with proper preoperative work up, proper peroperative techniques and judicious postoperative care.

To sum up, patients are brought to us with the hope that surgery may cure them with all the available knowledge, skill and material and hand. The best possible care is given to them. While most of them do well, unexpected complications, though unwarraned do happen in varying frequencies from place to place. A knowledge of such cases will help us to be better prepared to meet such demanding situations and avoid the precipitating factors in future. With this as the goal, the above anlaysis of reoperative abdominal surgeries has been done.

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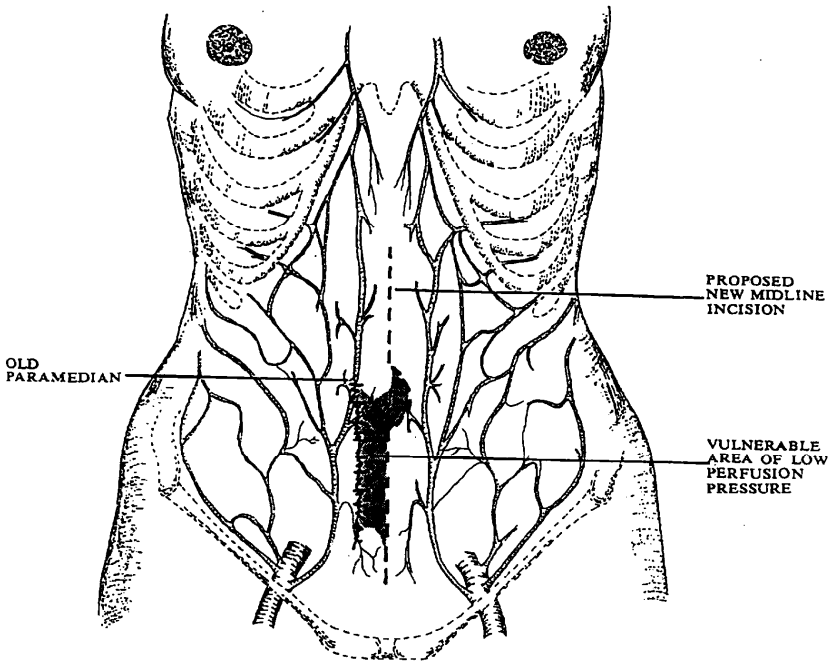
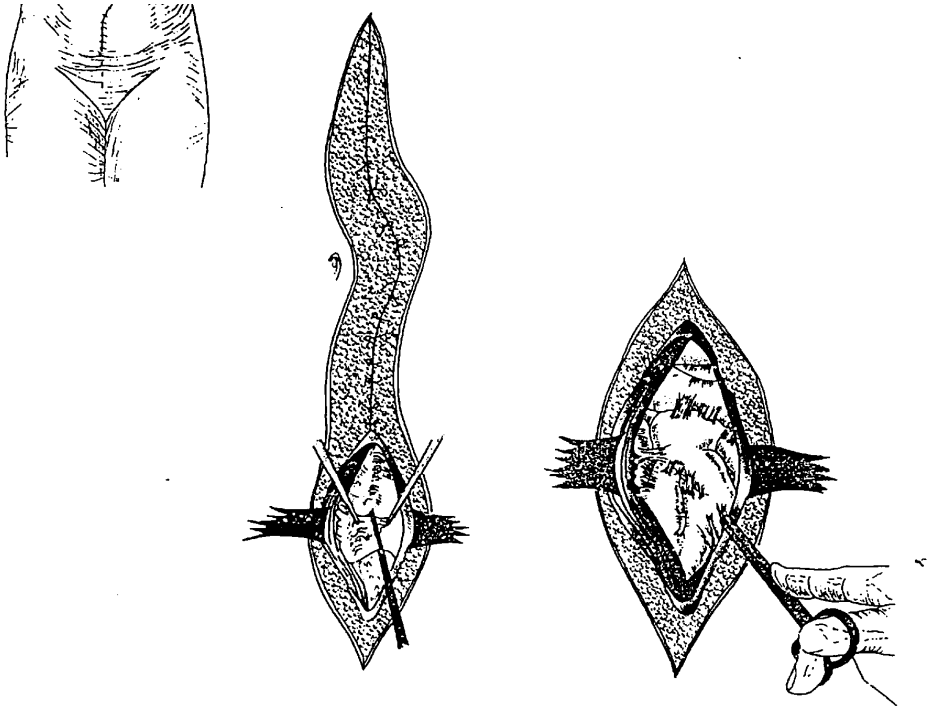
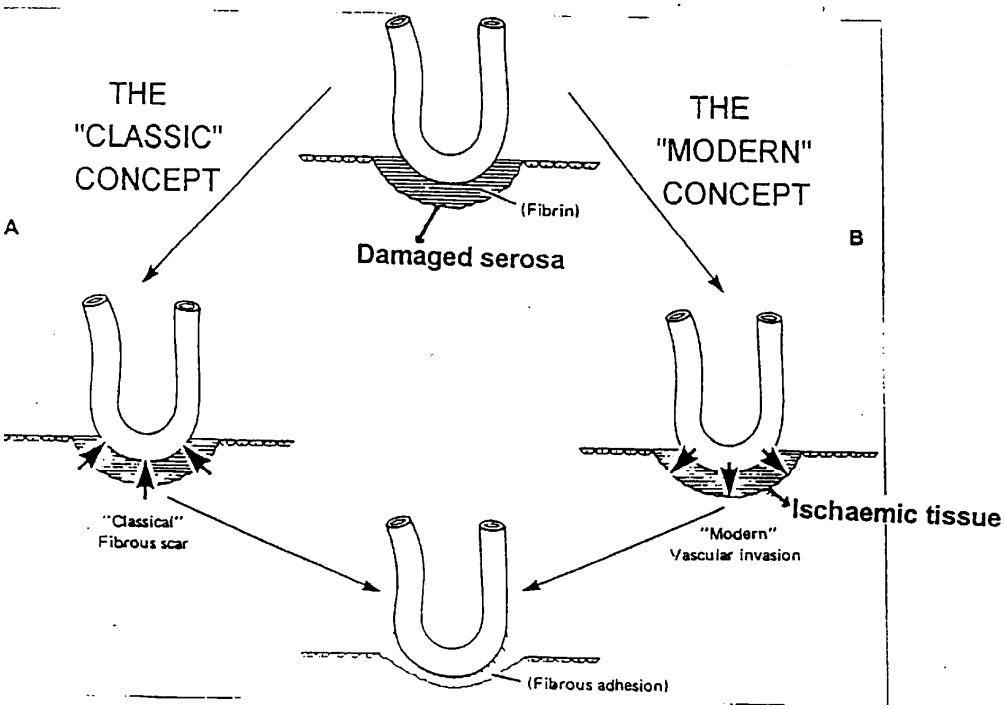


The effect a new vertical midline incision near an old paramedian incision. The shaded area shows where a low tissue perfusion pressure will be found after closure. It is vulnerable to impaired healing.

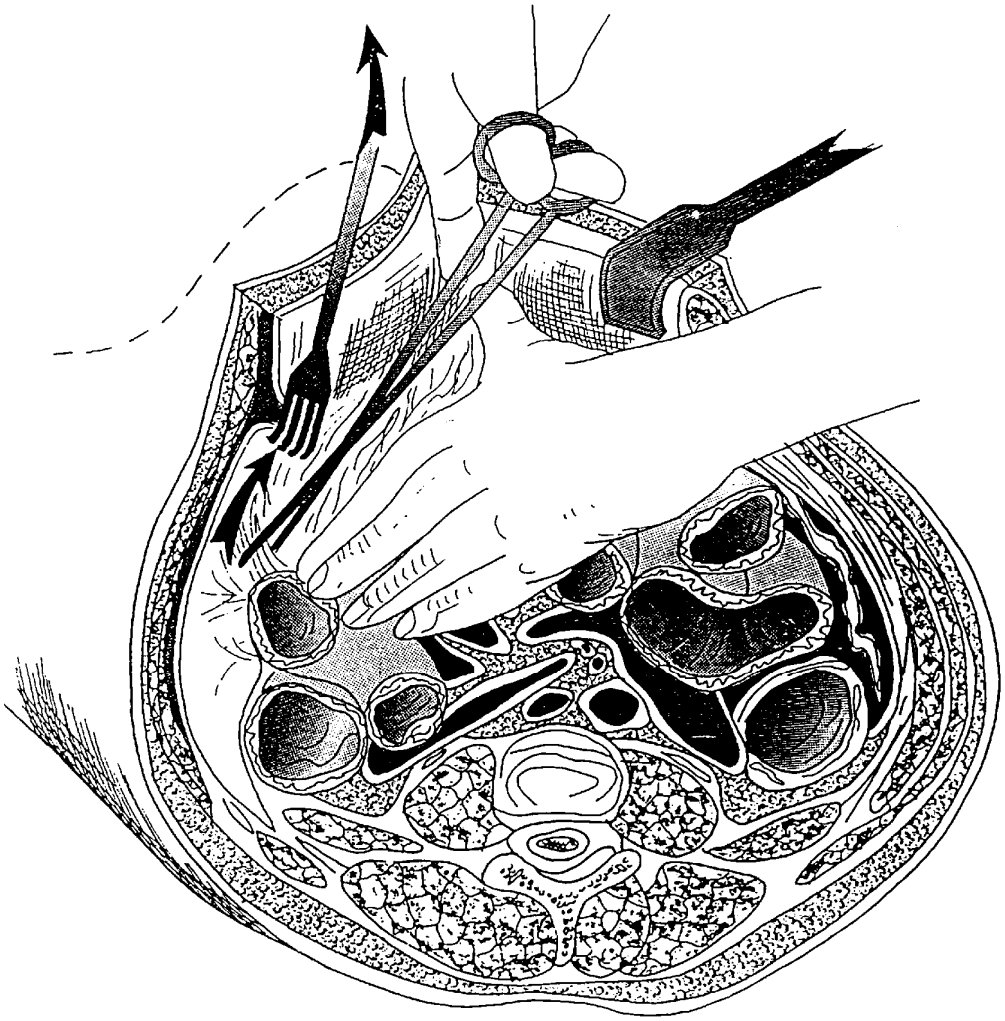


At reoperation, one enters the abdomen beyond the edge of the old incision, if possible. Usually the adhesions will be less dense at this point. In the lower abdomen, there may be a thicker layer of preperitoneal fat. Entry should be cautious and a small area freed of adhesions before extending the incision into the area of previous scar.

THE AETIOLOGY OF ADHESIONS

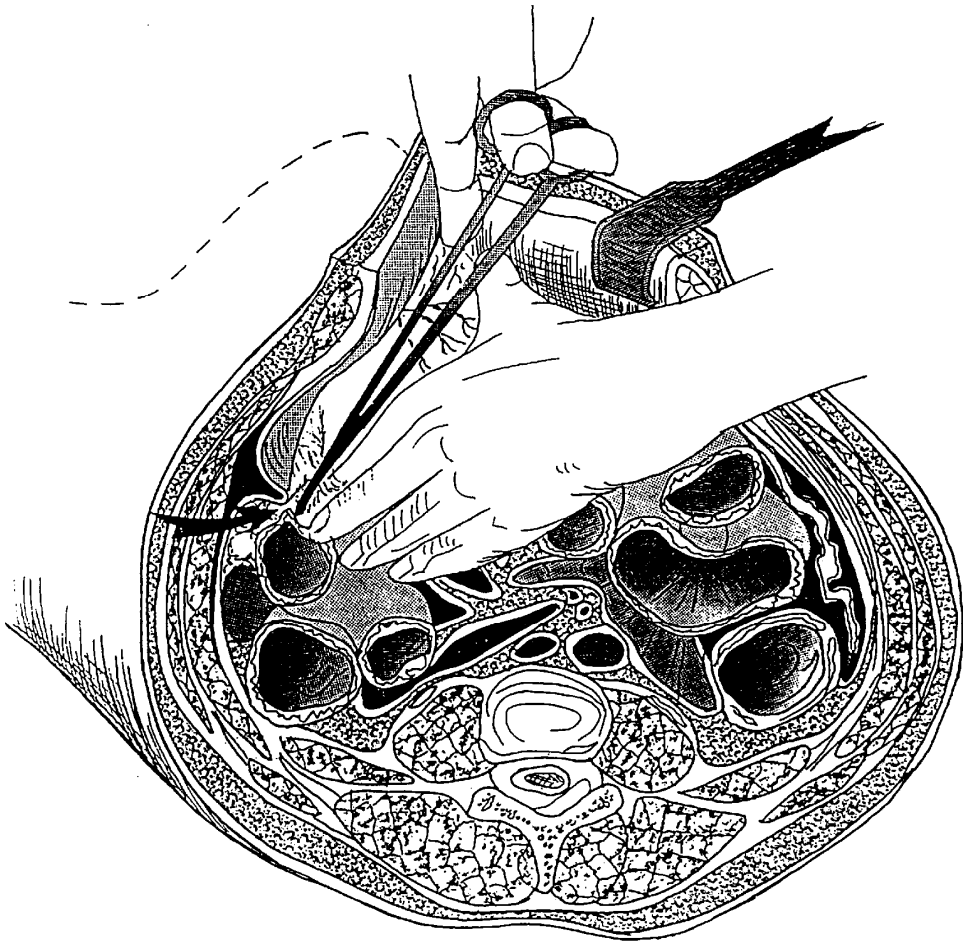


TECHNIQUES OF RELAPAROTOMY



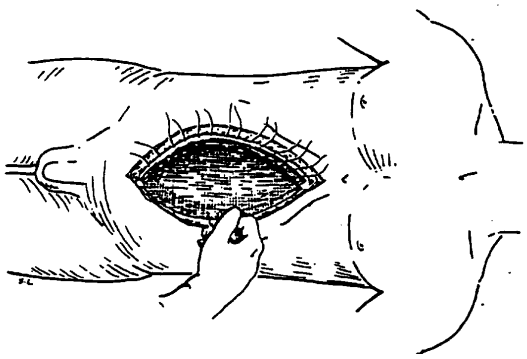
If tension is placed on the parietal peritoneum with retractors or with a Kocher clamp at the edge, then the area of dissection is lifted upward and the peritoneum is pulled smooth and taut in the area of the dissection. This makes countertraction more effective and brings the dissection higher in the wound.

TECHNIQUES OF RELAPAROTOMY



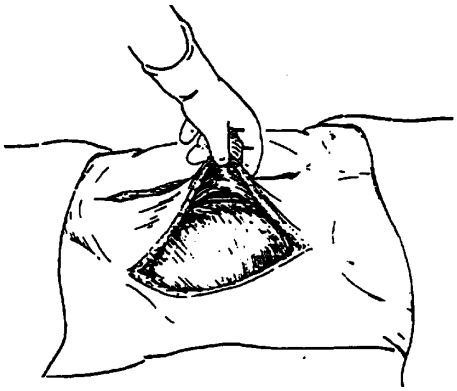
If one pursues a dissection to free the parietes in one single spot, lighting at the depths deteriorates. Tension with one or two fingers tents the bowel or peritoneum at points of dense adhesion. Slight misplacement of a cut can injure bowel that is thinned or tented in a deep recess.

POLYPROYLENE RECONSTRUCTION OF THE ABDOMINAL WALL

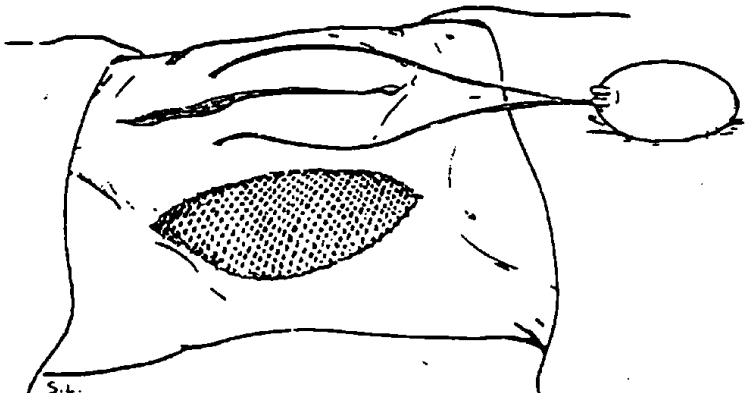


Placement and suturing of polypropylene mesh into the fascial defect on the abdominal wall

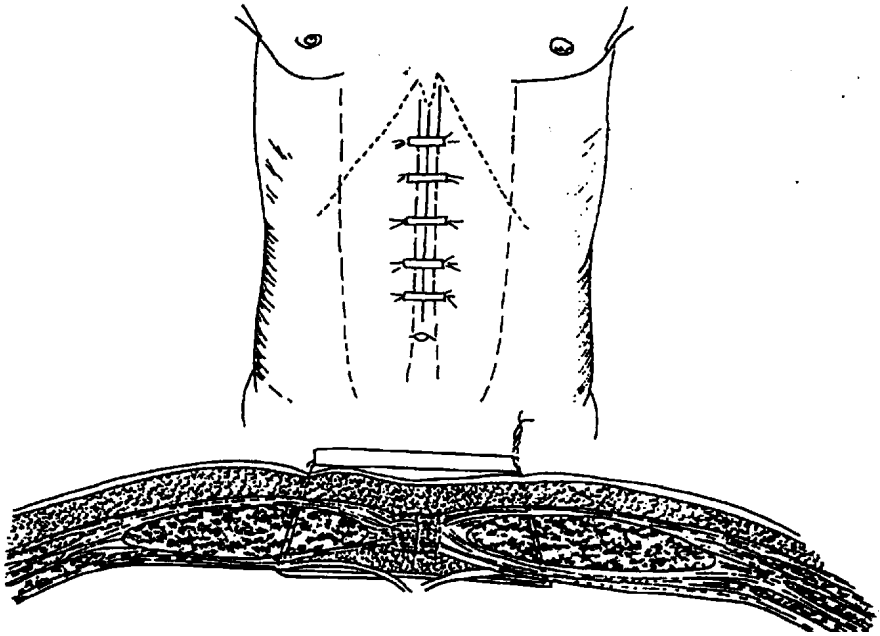
Flank counter-incision; Bipedicled flap; Unilateral bipedicled flap to be transferred over the midline soft-tissue defect



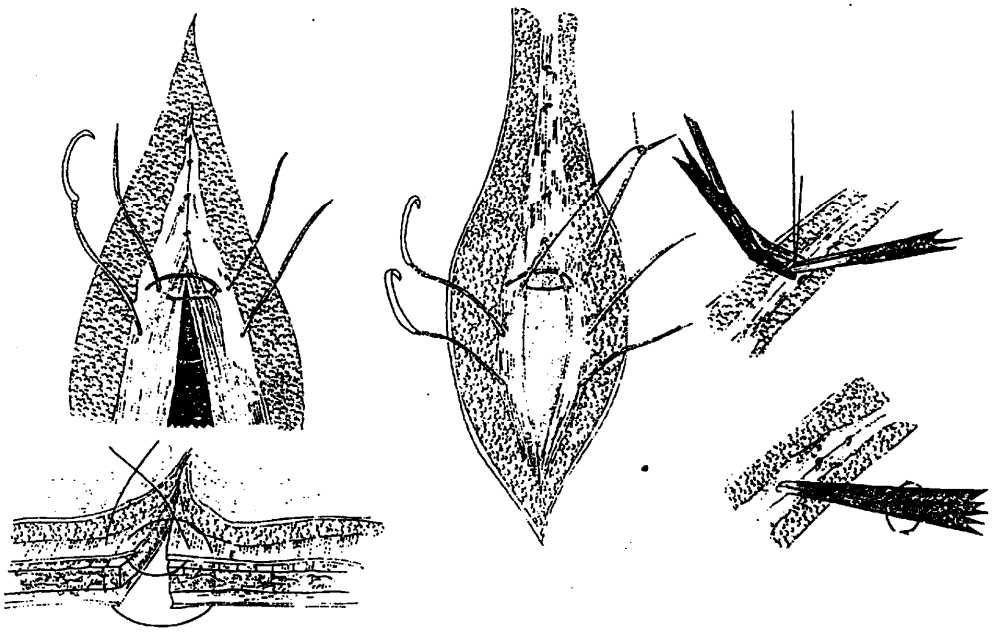
Undermining the bipedicled flap



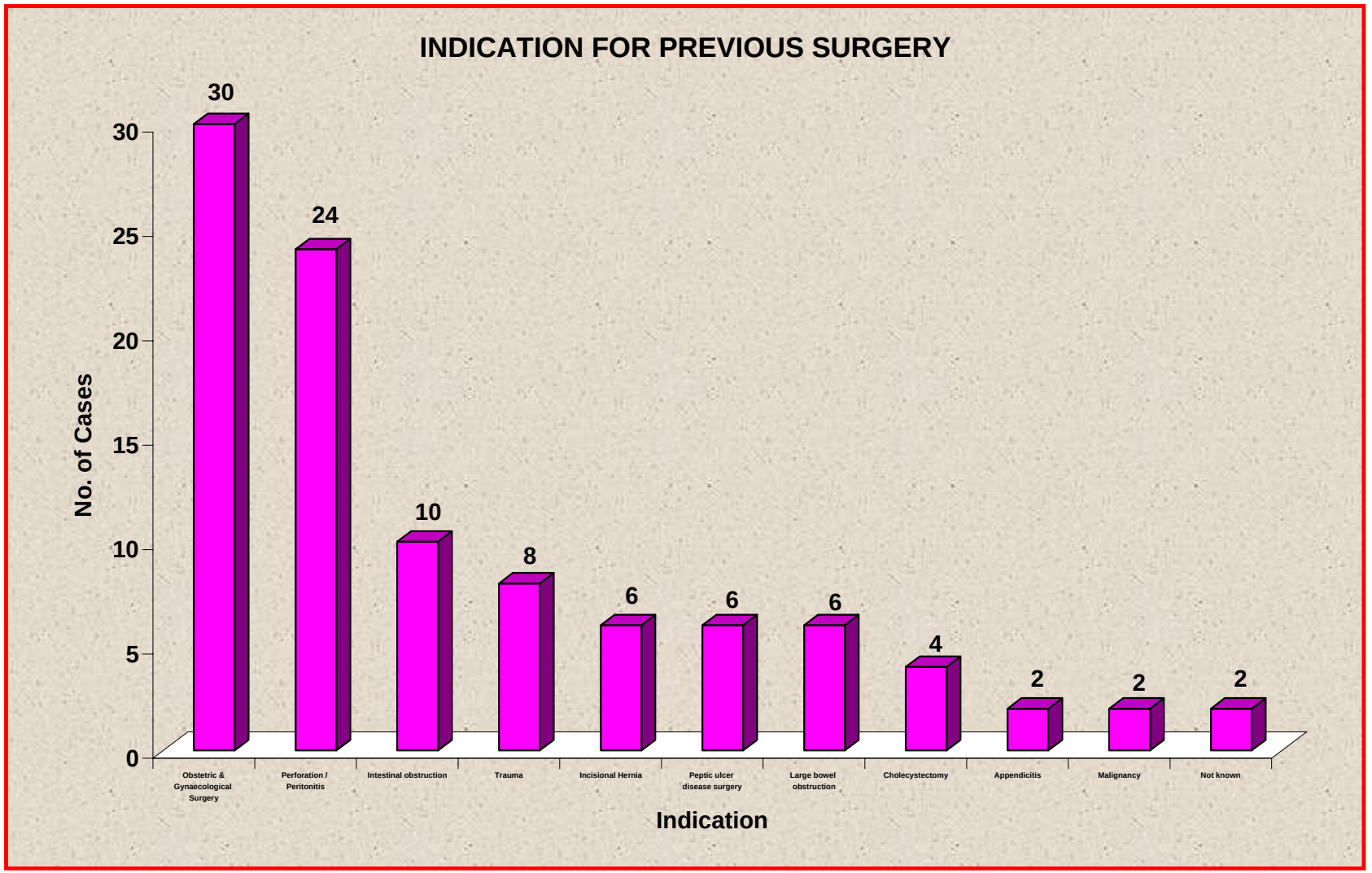
Medial displacement of the flap

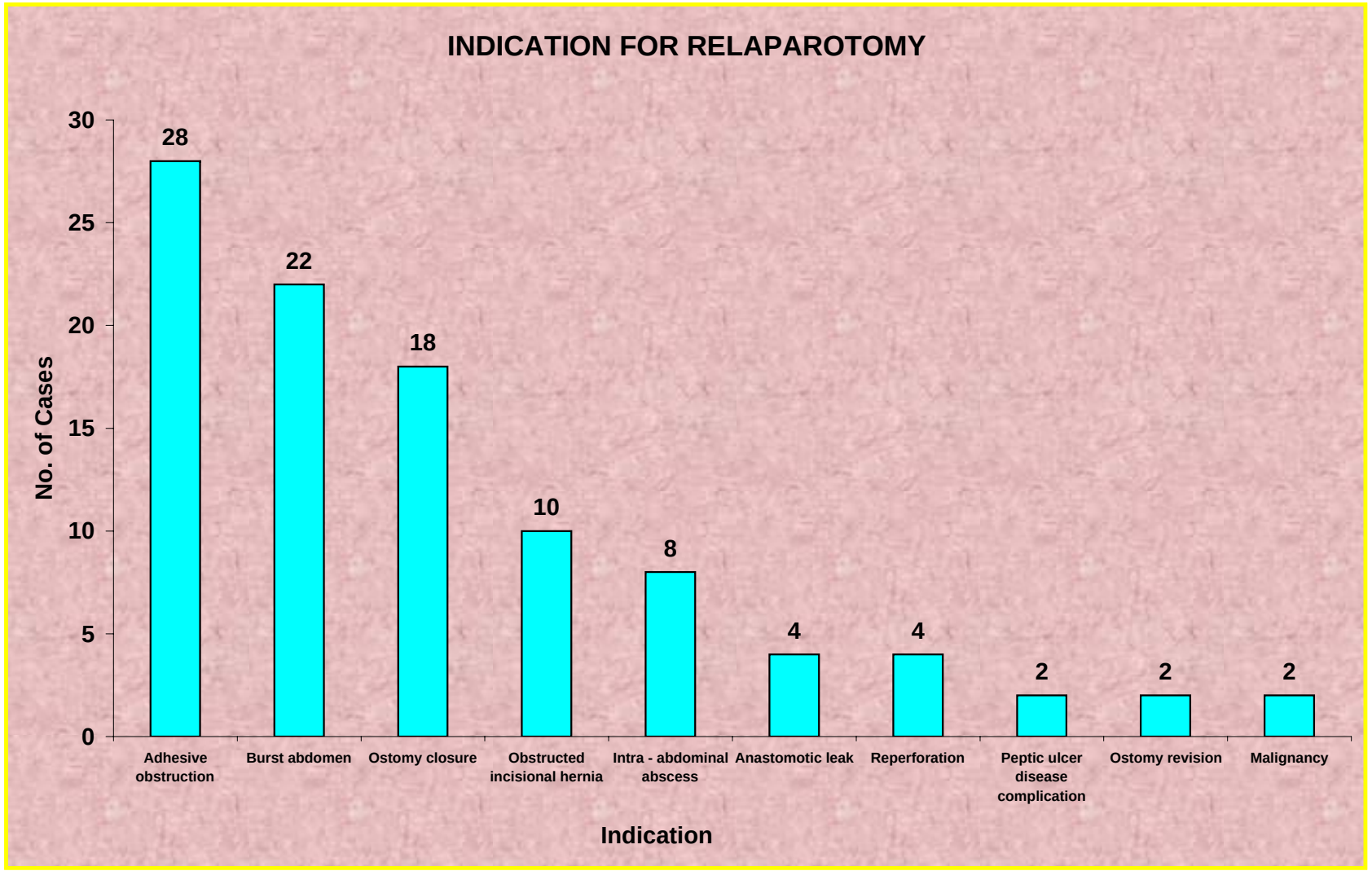


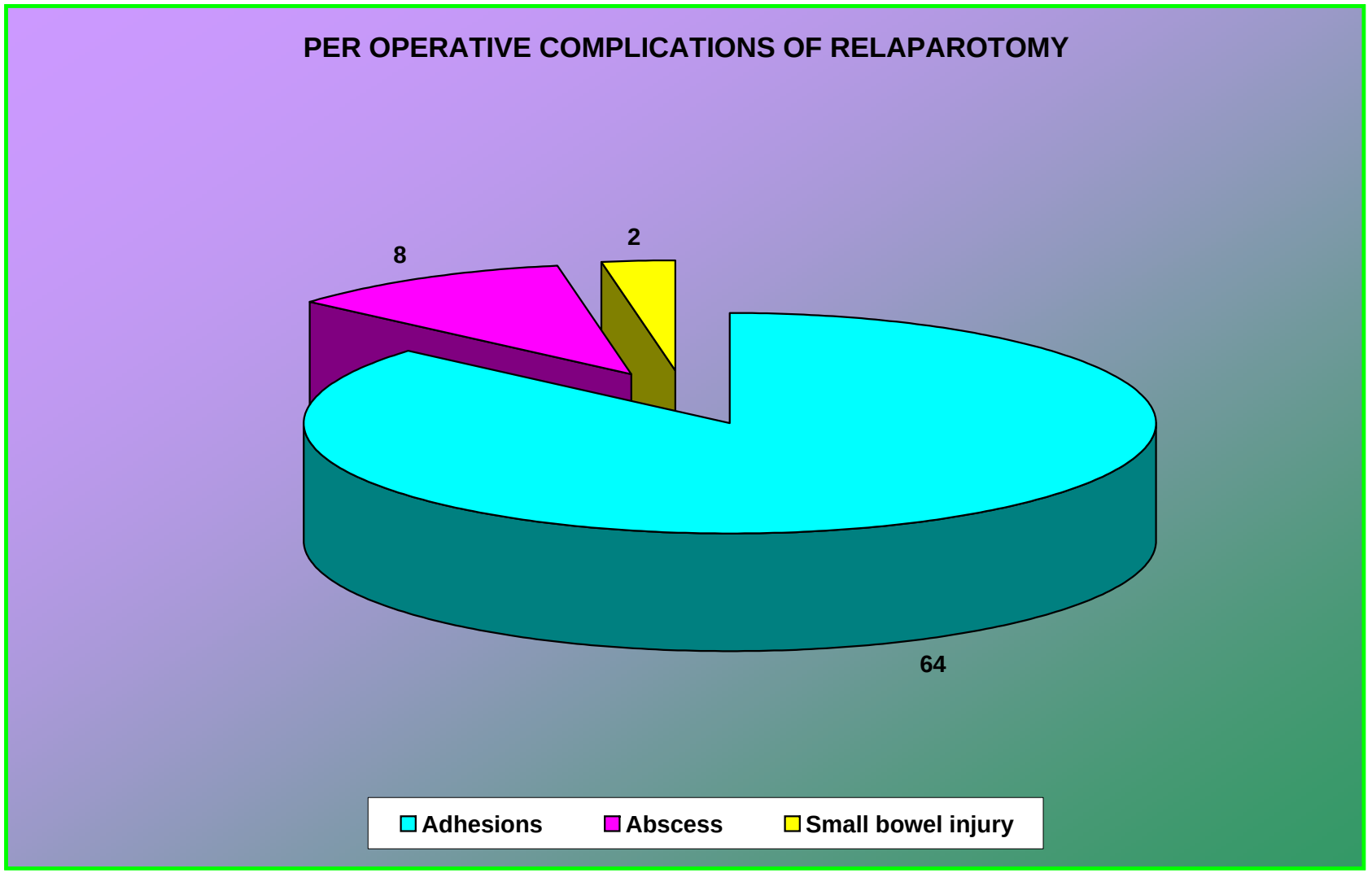
Commonly used retention sutures. The sutures traverse all layers of the abdominal wall and enter and exit the skin closer to the incision than the wider suture placement in the deep fascia. At the skin, the sutures are buttressed by placing them through short lengths of catheter.

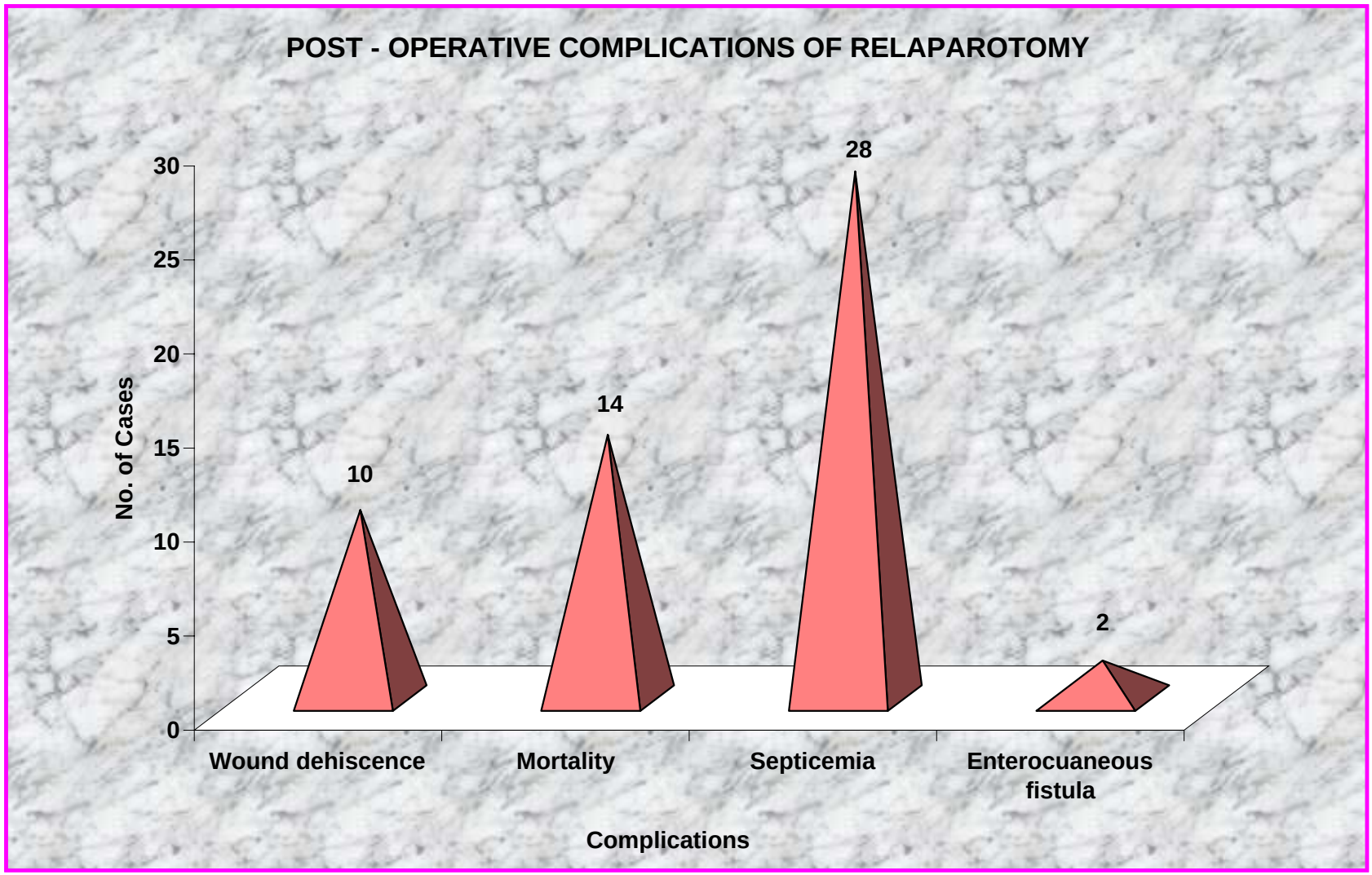


This illustrates the Smead - Joines far - and -near mass closure technique using interrupted stainless steel wire. The left lower inset shows the cross section of the figure - of - eight fascial closure.


INDICATION FOR PREVIOUS SURGERY
No. of Cases
0
5
10
15
20
25
30
30
24
10
8
6
6
6
4
2
2
2
Obstetric & Gynaecological Surgery
Perforation / Peritonitis
Intestinal obstruction
Trauma
Incisional Hernia
Peptic ulcer disease surgery
Large bowel obstruction
Cholecystectomy
Appendicitis
Malignancy
Not known
Indication


INDICATION FOR RELAPAROTOMY
No. of Cases
30
25
20
15
10
5
0
28
22
18
10
8
4
4
2
2
2
Adhesive obstruction
Burst abdomen
Ostomy closure
Obstructed incisional hernia
Intra - abdominal abscess
Anastomotic leak
Reperforation
Peptic ulcer disease complication
Ostomy revision
Malignancy
Indication


PER OPERATIVE COMPLICATIONS OF RELAPAROTOMY
8
2
64
Adhesions
Abscess
Small bowel injury


POST - OPERATIVE COMPLICATIONS OF RELAPAROTOMY
No. of Cases
30
25
20
15
10
5
0
10
14
28
2
Wound dehiscence
Mortality
Septicemia
Enterocuaneous fistula
Complications

Obstetric & Gynaecological Surgery	30
Perforation / Peritonitis	24
Intestinal obstruction	10
Trauma	8
Incisional Hernia	6
Peptic ulcer disease surgery	6
Large bowel obstruction	6
Cholecystectomy	4
Appendicitis	2
Malignancy	2
Not known	2

Adhesive obstruction	28
Burst abdomen	22
Ostomy closure	18
Obstructed incisional hernia	10
Intra - abdominal abscess	8
Anastomotic leak	4
Reperforation	4
Peptic ulcer disease complication	2
Ostomy revision	2
Malignancy	2

Adhesions	64
Abscess	8
Small bowel injury	2

Wound dehiscence	10
Mortality	14
Septicemia	28
Enterocuaneous fistula	2